1. **Properties, a sorting activity** (K-1). For this, each group of about 3-4 kids will need a small bucket containing small items. You can buy these in the craft section of Wal-Mart or at hobby shops, or you can make your own. There should be objects of many colors, shapes, sizes, compositions, uses, and so forth, and should include some objects made of more than one substance.

The principal learning outcome for this activity is for students to discriminate among ways to describe objects: learning types of properties, composition, shapes, uses, and the names of objects. For example, "button" is the name of an object, is use is to fasten things together, its shape involves holes through something, its composition may be plastic, metal, glass, wood, or other substance, and its properties may include hardness, color, or size. It will be important for children to be able to tell that these are all different kinds of ways to differentiate objects. They may say that "wood" is a property, or that "button" is the use of the object. These kinds of confusion may lead to misconceptions down the road, and this activity will help to focus their vocabulary skills.

The secondary learning outcome is for students to learn "rule-making." At a higher level, this may be known as and operational definition. These are similar to the "methods" section of research papers in which scientists are very clear about what they are doing. In rule-making, children state how they are carrying out their activity in terms as clear as possible. In the sorting activity, children must make a rule about their sorting. For example, the rule may be "all red objects are sorted into a single pile." Another rule might be "all objects that do not contain wood are placed in this pile." However, as the sorting proceeds, other children in the group may feel the rule is not quite correctly applied. An object that is not quite red, but is somewhat pink, or more of an orange than red may generate controversy. At this point, the rule may be clarified if the group feels that is appropriate. A complexity arises when students realize that some objects are made of more than one substance. They should be encouraged to address this, for example by sorting into groups using a rule of their drafting, such as "made of different materials." In this case, and all others, they should be able to defend their choices – why do they feel the objects are made of more than one thing?

An additional learning outcome should be to tie the activity to writing. While K students are just starting with writing skills, research has shown that given a clear direction, students will willingly rise to the challenge. Their writing skills should not be assessed at the earliest level, but should indicate as best they can what their rules are. For further help on this, teachers should familiarize themselves with the resource "Writing in Science" by Rupp Fulwiler and published by Heinemann Press.

In the activity itself, teachers should encourage groups of students to try as many sorting rules as possible given the time limitations. Keep a close eye on the students, and encourage them to mix up their sorting rules, to include not just colors, but compositions, shapes, uses, and as many different ways of thinking about objects as they can.

After the activity, have groups share their sorting rules. Here teachers can suggest other ways of sorting, especially to get at each of the categories listed above such as "made of different or the same substance." It may be helpful to have your kids refer to their written rules, too. Ask students whether the rules are perfectly written so there is nothing unclear. One example might be the rule "objects that are hard" so here the difficulty is "how hard is hard?" It is important to get students to think as clearly about what they mean as possible throughout this activity.

Point out to students that rule-making will always be used in scientific investigations in the classroom. If you are teaching science at a higher level (e.g. grades 2-5) and you feel students do not yet have an approach to scientific investigation that involves clearly describing what they are doing, then revisiting this sorting activity may be in order.